



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,375	08/31/2007	Neil Anthony Tivey	9052-240	9083
20792 7590 03/02/2011 MYERS BIGEL SIBLEY & SAJOVEC PO BOX 37428 RALEIGH, NC 27627				
EXAMINER LAZORCIC, JASON L				
ART UNIT		PAPER NUMBER		
1741				
MAIL DATE		DELIVERY MODE		
03/02/2011		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/575,375

Applicant(s)

TIVEY ET AL.

Examiner

JASON L. LAZORCIK

Art Unit

1741

Period for Reply
-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 1-7 and 15-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-945)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 4/11/2006, 7/14/2010
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group II, Claims 8-14 in the reply filed on 12/22/2010 is acknowledged. The traversal is on the ground(s) that the invention of Group I and Group II recite the common and novel inventive feature namely a switching element arranged to prevent or permit a mutual induction of current in a respective heating coil. Applicant asserts that the reference to Krupfer (GB 307044) fails to recite the feature of a switching element arranged to prevent or permit a mutual induction of current in a respective heating coil. Applicant thereby submits that the cited prior art fails to teach this limitation and concludes that the restriction requirement based upon a lack of unity in view of the Krupfer reference is not valid.

This is not found persuasive because the limitation upon which Applicant bases the instant argument is not construed to definitively limit the scope of the claim.

That is, according to the instant claim language, a behavior, namely mutual inductance, is either "prevented" or it is "permitted". A behavior which is "permitted" is construed to be substantially identical to and of the same scope as a behavior which is "not prevented". Thus, the claim limitation at issue is construed to require in the alternative that mutual inductance is either "prevented" or it is "not prevented", and the Examiner can construe of no other alternatives which are not wholly encompassed by these two alternatives. Since the instant limitation sets forth these opposite and incompatible states in the alternative, the instant limitation does not substantively limit the scope of the claimed invention.

Further, Applicant has failed to present any reasoned basis to suggest that the switching elements of Krupfer do not either act to permit or alternately to prevent mutual inductance in adjacent heating coils as presently claimed.

Finally, it is respectfully noted that the reference to Uchida (WO 2004/004420) as cited below also teaches every limitation of at least independent claim 8.

The requirement is still deemed proper and is therefore made FINAL.

In view of the foregoing, Claims 1-7 and 15-19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim.

State of the Claims

Claims 1-21 have been presented in the instant application. Claims 20-21 have been cancelled by Applicant, and claims 1-7 and 15-19 stand as withdrawn from consideration with traverse pursuant to the restriction/election requirement dated June 28, 2010 and Applicants response thereto dated December 22, 2010. Therefore, claims 8-14 are pending for prosecution on the merits.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 8, 9, 10, and 13 are rejected under 35 U.S.C. 102(a) as being anticipated by Uchida (WO 2004/004420 - Published January 8, 2004; Please note specific citations to the instant reference are made with respect to the United States Patent equivalent document US 7,202,451).

With respect to claim 8, Uchida teaches (see figure 10, col. 1, lines 54-65) an apparatus capable of melting glass via induction melting which comprises a current conducting melting vessel (40) made from, for example, carbon and comprising at least two induction heating coils provided proximate to the melting vessel (48a, 48b). With particular reference to figure 1 (col. 7, line 57-col. 8, line 31), a plurality of power supply circuits (110m, 110s) are respectively associated with one of the heating coils (152m, 152s). Each power supply comprises a switching circuit (114, 120) which is arranged in such manner to prevent mutual induction of current in a respective coil when an adjacent coil is energized (col. 5, lines 53-67).

Regarding claim 9, see figures 10 and 1.

Regarding claim 10, see element (114) in figure 1 and col. 7, lines 59-60.

Regarding Claim 13, see condensers (154m, 154s). Said condensers are charged by the power control circuit depending on the state of the switching element

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Apple (US 3,244,495) in view of Uchida (WO 2004/004420) as applied to claim 8 above.

Apple teaches an induction heating furnace comprising an inlet (12), outlet (17) attached to vessel (13). Apple teaches that each of the vessel, inlet and outlet are heated via respective heating units.

Although Apple does not explicitly teach the presence of a drain outlet as presently claimed, such a modification would have been construed as an obvious

extension over the Apple disclosed structure for one of ordinary skill in the art at the time of the invention seeking to facilitate periodic shutdown of the furnace.

Apple teaches use of an induction coil (21) to heat vessel (13) and associated AC circuit to control the induction coil. Apple further teaches separate heating means and heater controlling means for each of the inlet (12) and outlet (17). Apple teaches that provision of heating means at the inlet and outlet and main body allow precise control of the viscosity of the glass at a particular area of the furnace and that such control over the viscosity allows control over the rate of glass flow through the inlet and outlet of the furnace.

Apple is silent regarding the nature of the inlet or outlet heating means.

As noted above, Uchida teaches every aspect of Applicants induction melting furnace comprising plural adjacent induction coils for selectively heating a respective region of the melt furnace and further comprising switching elements associated with each coil and arranged to prevent mutual induction between adjacent coils.

In view of the prior art of record, one of ordinary skill in the art would have found it obvious to employ the Uchida induction coil heater arrangement for each of the Apple inlet, outlet and main vessel induction coil heaters. Specifically, Uchida demonstrates that the disclosed system provides effective control over the temperature distribution

within an induction furnace which is similar to that disclosed in the Apple reference. Further Uchida teaches that the disclosed induction heating coil arrangement beneficially prevents mutual induction of current in adjacent inductor coils.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uchida (WO 2004/004420) as applied to claim 8 above, and further in view of Simcock (US 5,349,167)

As noted above, Uchida teaches every aspect of Applicants induction melting furnace comprising plural adjacent induction coils for selectively heating a respective region of the melt furnace and further comprising switching elements associated with each coil and arranged to prevent mutual induction between adjacent coils.

Uchida is silent regarding the operating frequency of the power supply.

In a closely related body of work, Simcock teaches a rectifier inverter power supply for use in powering the induction coil of an induction heating or melting apparatus with multiple zone heating control. Of particular relevance, Simcock teaches that the circuit operates to provide a frequency from approximately 50 Hz to approximately 10 kHz of pulsed power to the coil.

In view of Simcock, one having no more than a routine level of skill in the art at the time of the invention would have been fully equipped to select an appropriate

operating frequency of the Uchida induction heating power supply. Further, a skilled technician would have reasonably derived a circuit capable of operating within the claimed operating frequency of 50 Hz through no more than routine experimentation and optimization of the prior art disclosed device.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Applicant is advised to carefully review the additionally cited prior art of record.

Of particular relevance, the United States patents to Fishman (US 6,121,592) and Fishman (US 7,197,061) disclose induction heating devices which employ separate and adjacent induction heating coils (see respective figures 1 and 2). Each of the noted references teaches the use of antiparallel SCRs (e.g. thyristors) employed in the power supply circuit for each coil and provided in an arrangement which closely parallels the arrangements of the first (81) and second (84) switching elements of the instant application. Where the Specification of the instant application attributes the thyristor arrangement of the first switching element (81) with the prevention of mutual inductance in adjacent coils (see paragraph [0056]), it is the Examiners assessment, absent compelling evidence to the contrary, that each of the Fishman devices would similarly prevent mutual inductance in their adjacent inductance coils even though such a behavior is not expressly discussed in either reference.

Applicant is respectfully requested to address this matter in response to the instant Official Action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON L. LAZORCIK whose telephone number is (571)272-2217. The examiner can normally be reached on Monday through Friday 8:30 am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Daniels can be reached on (571) 272-2450. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jason L Lazorcik/
Primary Examiner, Art Unit 1741

